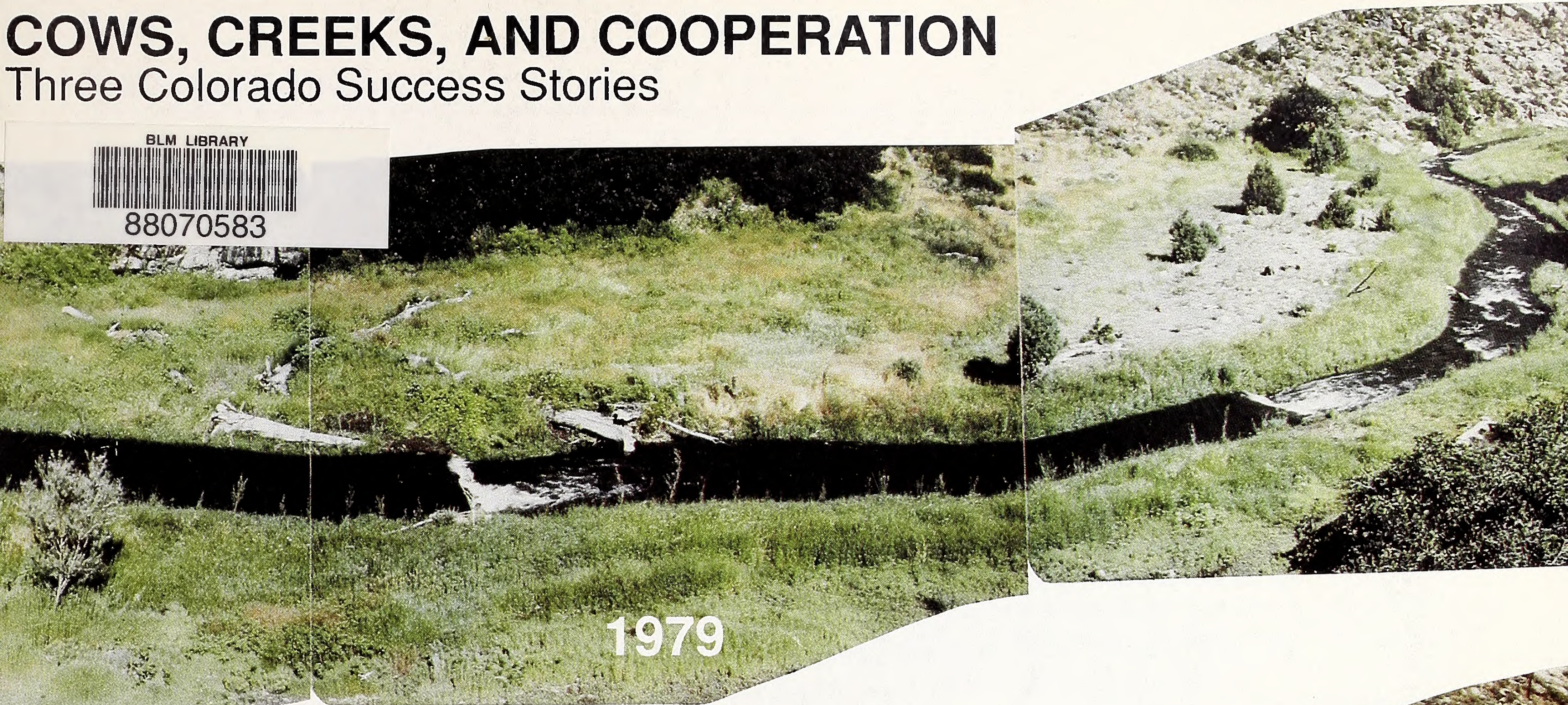
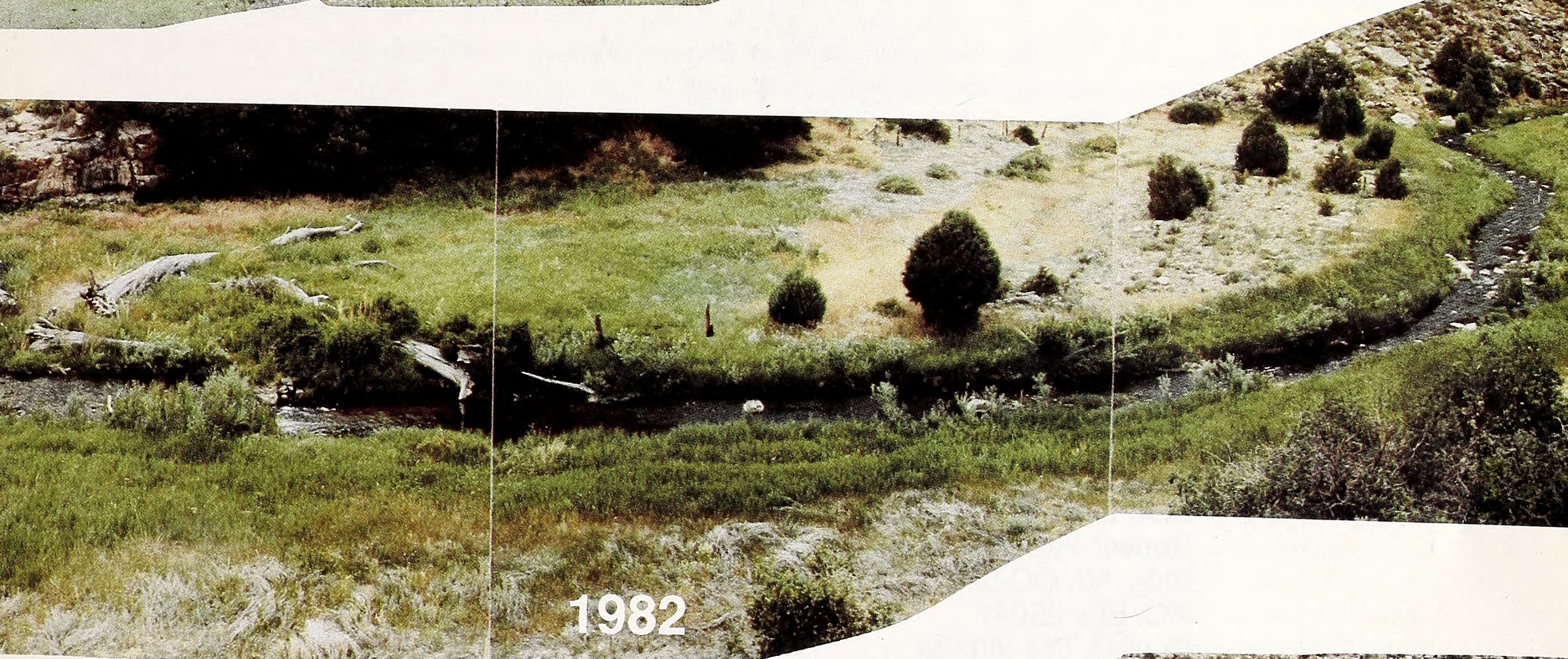
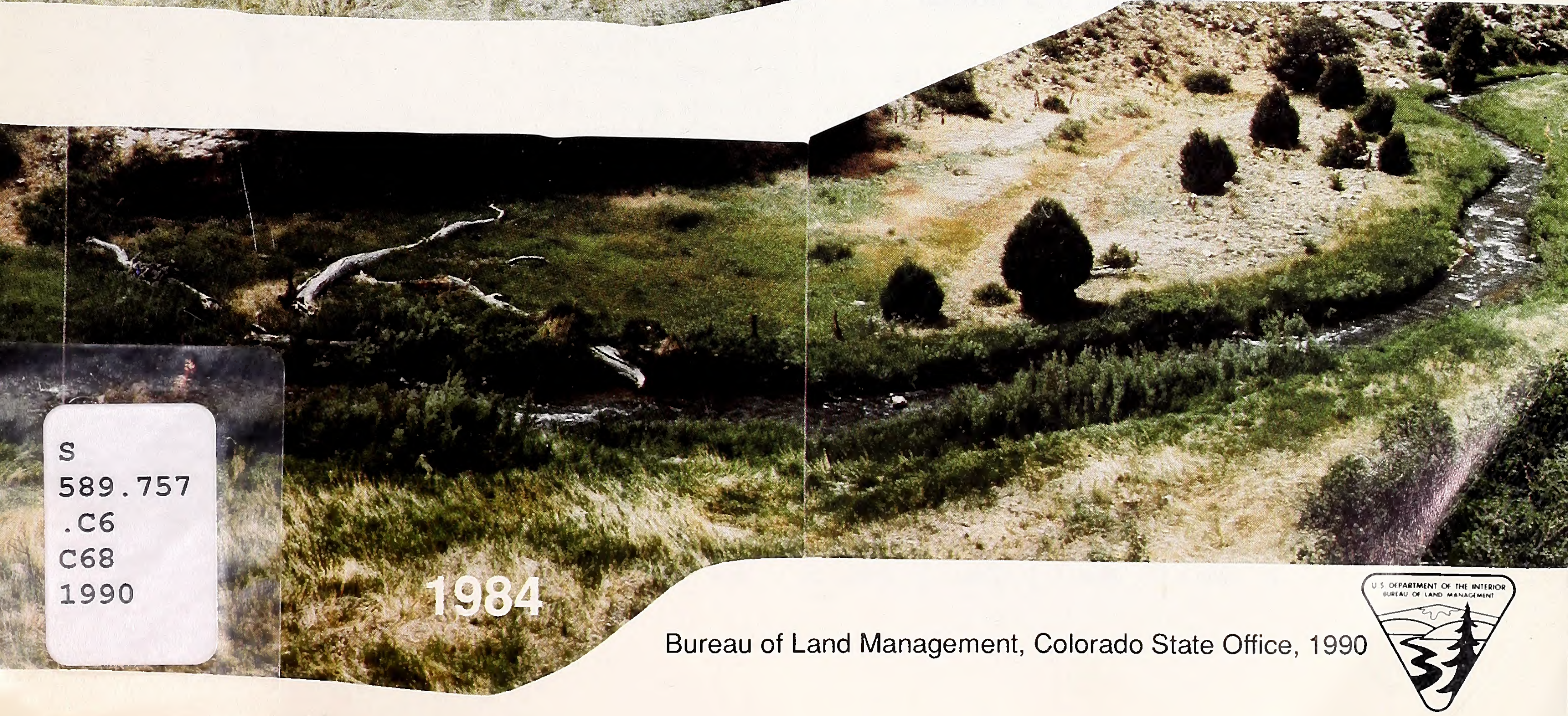
COWS, CREEKS, AND COOPERATION

Three Colorado Success Stories

BLM LIBRARY
88070583







S
589.757
.C6
C68
1990

Bureau of Land Management, Colorado State Office, 1990

The Bureau of Land Management (BLM) manages over 8 million acres of Public Land in Colorado. Colorado Public Lands provide wildlife habitat, forest products, wild horses, wilderness, recreation, watersheds, livestock grazing, archaeological resources, minerals, oil and gas, and opportunities for other public purposes.

This brochure focuses on Rangeland Management and three of the many successes achieved through planned livestock grazing and the cooperation between Colorado ranchers and BLM. All three stories involve the restoration of riparian areas. Riparian area management is a relatively recent management emphasis for BLM. However, riparian area management has been occurring in Colorado since the 1970s.

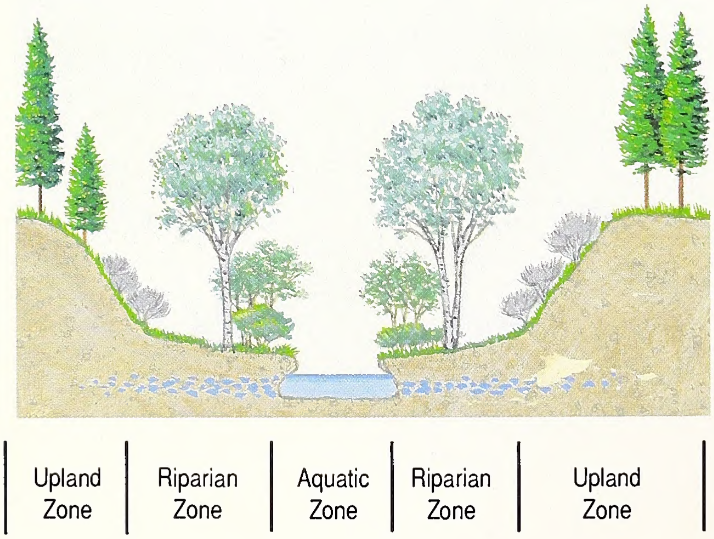
As society continues to change, additional issues will emerge to increase the complexity of rangeland management. Biological diversity, threatened and endangered species habitat management, wild horse management, and increased demand for wildlife habitat and recreation opportunities are but a few of the intensifying issues facing rangeland managers.

The three articles aptly describe how "cows" and "cooperation" can improve productivity of Colorado's rangeland resources, including riparian areas along "creeks" and streams. BLM employees in Colorado invite your participation in enhancing tomorrow's legacy through cooperative management today.

Bob Moore

H. Robert Moore
Colorado State Director

BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225



What is a Riparian Area?

Riparian areas are the lush, well-vegetated areas immediately adjacent to streams, lakes, ponds and other bodies of water. Riparian vegetation requires the influence of surface or ground water.

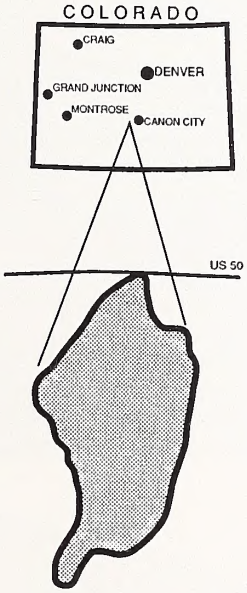
#31305677 ID 88070583 SB 589.75 .C6 C68 1990

Successful Range Management in the McCoy Gulch Riparian Demonstration Area

Tom Grette

Introduction

The McCoy Gulch Riparian Demonstration Area is located in the Royal Gorge Resource Area of the Cañon City District of the Bureau of Land Management (BLM), and demonstrates effective use of livestock to manage a riparian area. The area was originally fenced in 1986 to protect the woody riparian vegetation from livestock grazing. The demonstration area that is fenced is approximately 5 acres, and is part of an allotment of 320 acres.



McCoy Gulch is classified as a third order perennial tributary to the Arkansas River. It is a spring-fed sandy wash with headwaters in the foothills of the Sangre de Cristo Range. High intensity summer thunderstorms occur along its length in mid and late summer. Spring flooding due to snow melt is uncommon because of the geology higher in the watershed. The coarse soil texture results in infiltration into the ground and less runoff of spring snowmelt.

Climate in the area is semiarid with hot summers and mild winters, with the most dependable precipitation occuring during the summer period. Springtime is generally dry with grass green-up occurring in April. Vegetation of the upland areas of the allotment is a pinyon/juniper-dominated woodland with interspersed open blue grama parks. Approximately one-half mile of riparian habitat exists on the allotment. Vegetation of the riparian area is dominated by willows, bluegrass, tufted hairgrass, and some cottonwood and salt cedar. Watershed condition throughout the allotment is classified as poor to fair.

The allotment is used as a livestock calving area in January and February and cattle stay on the allotment until the last part of April or the first part of May. High protein content alfalfa and cake are fed as protein supplement to the pregnant or lactating cows. The rolling topography, available water, and good county road access make it an ideal calving area.

Problems

Woody riparian vegetation was almost nonexistent in 1984 because of unregulated winter use in the willow areas. Upland range condition was classified as poor to fair despite a winter season grazing use period and moderate levels of utilization on grass. Most of the riparian area was dominated by weeds and bare ground. It looked like a sandy wash and was not even considered a riparian area. In 1984, the grazing season was changed from winter to spring at the request of the permittee. At this time, the cattle use shifted from willows to grass, resulting in an increase in willows.

Techniques

Even though willows were increasing, the riparian area was fenced, and use on the willows has since been regulated. Willow utilization limits are keyed to the younger willows used for browsing. The cattle seem to browse the tips of each young willow stem once before returning to browse any of them a second time. Approximately four to five inches of the leaders are removed in each pass (Photograph 1). The objective is to have each leader browsed just once. Light browsing stimulates branching of the leaders similar to a pruning. The utilization objective for western wheatgrass, indian ricegrass, and blue grama is 80%.

Protein supplement feeding is required on upland areas where grass is sparse. The supplement is fed on areas where banks are steep, annuals are dense, and on sandbars or bare ground where vegetation is having trouble getting established (Photograph 2). The idea in the demonstration area is to use animal impact to advance plant succession from the early seral stage to at least mid-seral stage, and to help reduce bare ground.

Cattle numbers vary from year to year as does duration of grazing. When the utilization objective inside the riparian pasture is met, cattle are removed, irrespective of the number of cattle involved. Also, since the riparian use is during the dormant season, duration of grazing use is not as important as it would be during the growing season, when damage to plants is most likely to occur.

Leaving a high stubble height of grass in the riparian area is not an important factor because the area is not subject to spring flooding. By the

---

The author is a Range Conservationist for the Bureau of Land Management, Royal Gorge Resource Area, Cañon City, Colorado.

Photo 1. Willow use at 4–6 inches and showing lateral branching.

Photo 2. Rusty Ross, livestockman, and author examine area where hay was intentionally fed to livestock.

time floods are likely to occur from the summer thunderstorms, cattle have been gone for a sufficient time that the new growth will trap sediment and hold the sandy bottoms in place with a healthy root system.

Results

The riparian habitat of McCoy Gulch has improved dramatically. What was once a sandy wash with bare ground and weeds is now dominated by willows and a few cottonwoods (Photographs 3a, 3b, 4a and 4b). On the upland areas, where trampling and manure were evident, the vigor of blue grama and sand dropseed has greatly improved. In the sandbars along the riparian area, cheatgrass is being replaced by a high number of sand dropseed seedlings.

A quadrat frequency trend study was used to determine changes in ground cover, canopy cover, basal cover of live vegetation, and species composition in the upland portion of the demonstration area. Baseline data was collected in 1987 and resampled in 1989.

Results after two years were as follows:

—Bare ground increased by 9%
—Litter decreased by 10%
—Basal cover of live vegetation increased by 1%
—Canopy cover increased by 6%

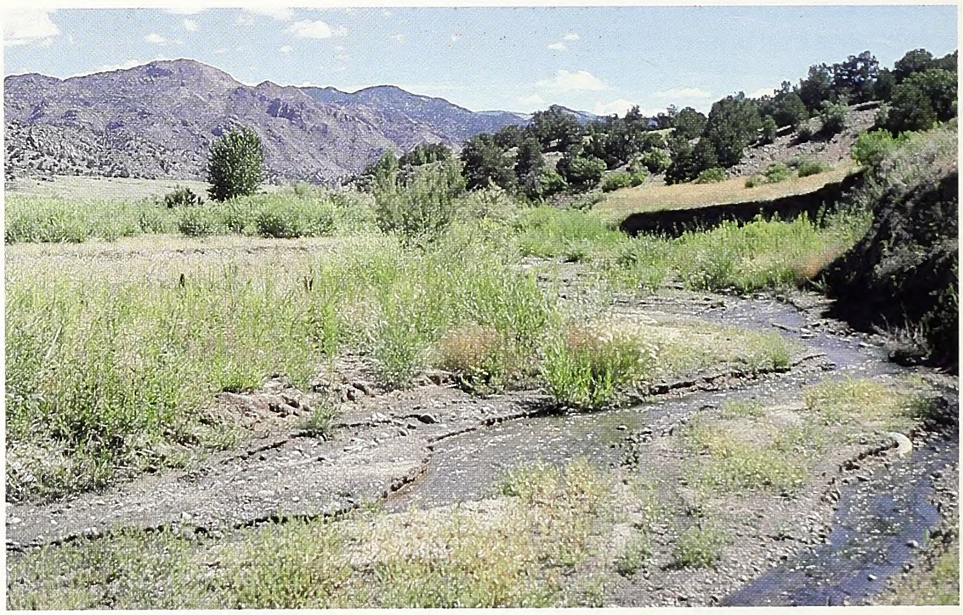


Photo 3a. McCoy Gulch—July 1987.

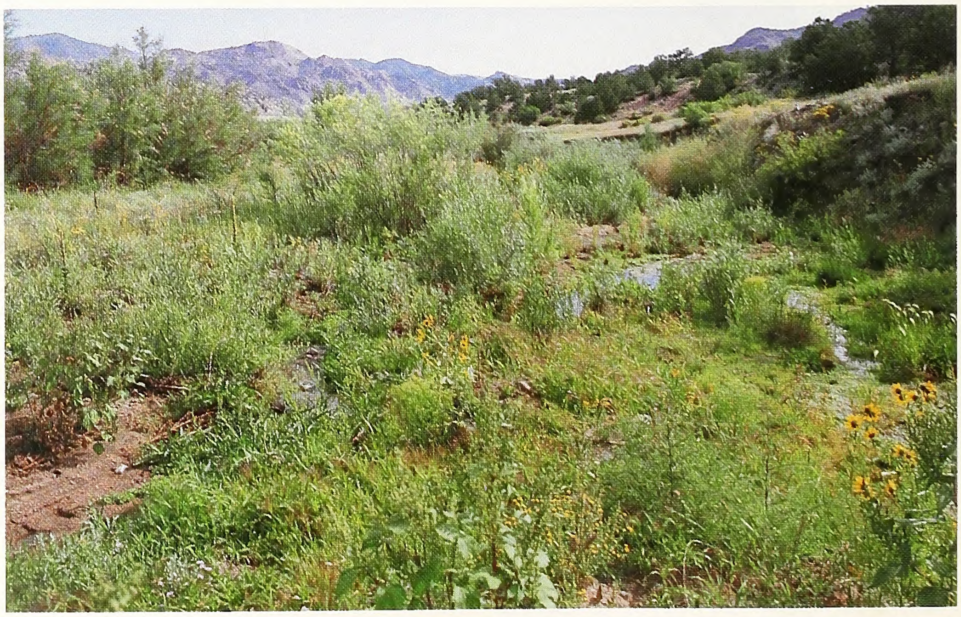


Photo 3b. McCoy Gulch—September 1990.

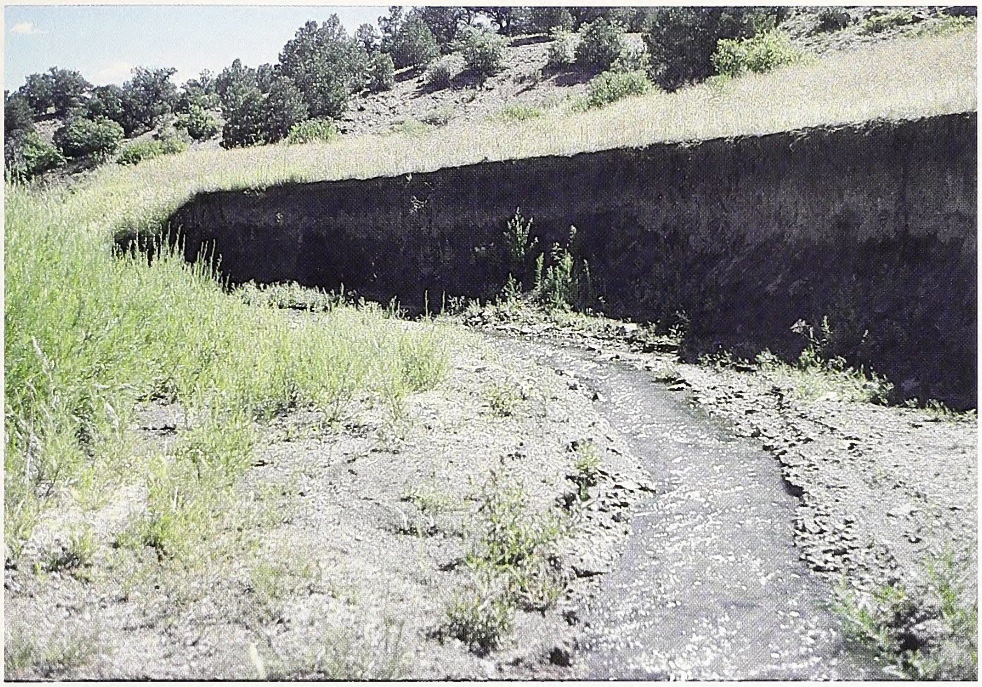


Photo 4a. McCoy Gulch—July 1987.

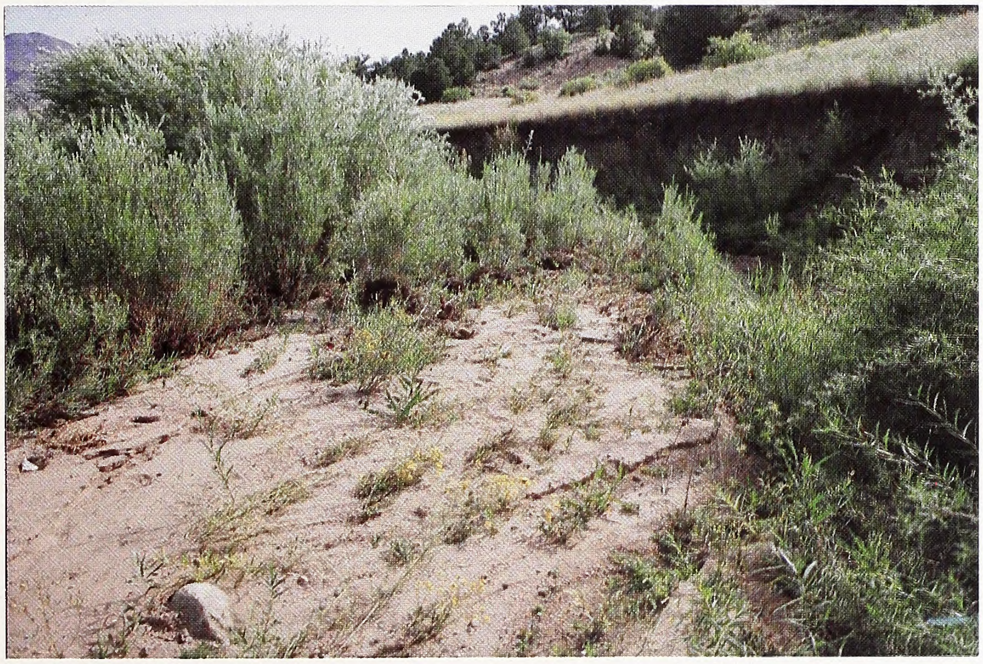


Photo 4b. McCoy Gulch—September 1990.

Significant changes in species frequency were:

—Cheatgrass down 98%
—Sand dropseed down 32%
—Perennial forbs up 72%
—Frequencies of blue grama, red threeawn, indian ricegrass, western wheatgrass and annual forbs were not significantly changed

Utilization was estimated using key species of western wheatgrass, indian ricegrass, and blue grama. Percent use by weight was estimated rather than clipping and weighing. The estimated utilization for 1987 was 62% and for 1989 was 80%.

Conclusions

This study has shown that woody riparian vegetation can improve with livestock grazing, even with heavy use on grass species, as long as the use on the willows is regulated. Animal impacts appear to have improved the vigor of existing perennial grasses and forbs. Bare ground increased in the study area by about the same amount that litter decreased. This is probably due to factors such as the higher stocking rate in 1989, lower production of annuals in 1989, and unauthorized removal of manure from the study site by a local man for use as fertilizer.

The allotment was recently divided into three pastures with the two pastures outside of the demonstration area each containing riparian reaches. The management strategies will expand to these pastures to use livestock to manage riparian and uplands together.

The McCoy Gulch Allotment permittee, Rusty Ross, has been very cooperative with BLM in the shift of management strategy. It has added flexibility to his operation, resulted in an increase in the Animal Unit Months available, reduced health problems with cows and calves, and provided fresher forage (due to higher utilization levels). His creativity, suggestions, and observations are an asset to management in the uplands as well as the riparian pasture.

The McCoy Gulch Allotment is similar in vegetation and topography to much of the Royal Gorge Resource Area. The riparian improvement techniques that are developed in this study will be applied in areas of the Resource Area that have riparian and similar upland conditions. Allotment management plan revisions will be prioritized according to potential for riparian improvement as well as cost benefit analysis.

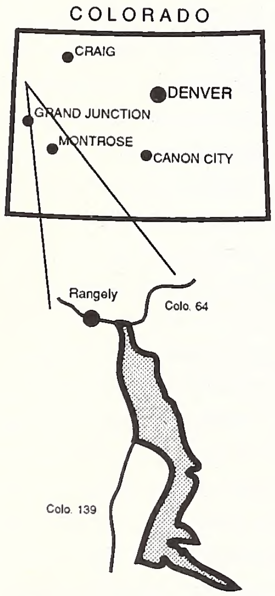
Grazing Management Heads Colorado Range in Right Direction

Robert Fowler

Introduction

As a Range Conservationist for the Bureau of Land Management (BLM) in northwest Colorado, I have helped manage many allotments. The most dramatic success story I've been involved with is the Cathedral Bluffs Allotment.

The Cathedral Bluffs Allotment is in the Craig District, BLM, and is administered by the White River Resource Area in Meeker, Colorado. The land lies just east of Rangely, Colorado, and runs north to the White River and south to Douglas Pass. The allotment includes 90,424 acres of public land and 16,131 acres of privately owned land. All is managed as one unit.



Description of the Area

The topography, vegetation types, elevation and climate are highly variable within the allotment. Average annual precipitation ranges from 11 inches in the lower elevations along the White River to 25 inches on higher elevation mountain areas along the southern boundary. In the lower elevations precipitation occurs as rain primarily through intense summer thundershowers. At higher elevations, more than half of the annual precipitation falls as snow.

The northern one-third of the allotment is low country used for winter grazing. Elevations range from 5,200 feet to 6,400 feet. The topography is characterized by deeply dissected canyons with easterly aspects (Photograph 1). The south-facing slopes "bare off" quickly providing forage, and rim rock formations provide protection to livestock and wildlife during winter storms. Predominate vegetation types are pinyon/Utah juniper on the ridge tops and north slopes, salt desert shrub on the south- and east-facing slopes. The pinyon/juniper association at these lower elevations provides little forage but does provide thermal cover for livestock and wildlife. The salt desert shrub association provides the bulk of winter forage. Important forage species include Colorado wildrye, indian ricegrass, beardless bluebunch wheatgrass, and shadscale. Production on this association averages 800 pounds per acre.

The central section of the allotment is used for spring and fall grazing. Elevations of this area range from 5,700 to 7,200 feet. Topography varies from canyons, ridges, alluvial bottoms, and echelon drainages to mountain slopes. Canyons and ridges are dominated by pinyon and Utah juniper. As the elevation increases, the pinyon becomes more dominant and the understory becomes more productive. Scattered sagebrush/grass parks occur within the pinyon/-juniper type. South slopes support the salt desert shrub association as in the low country, but with western wheatgrass, needle and thread grass, and sagebrush increasing in composition. The lower elevation drainage bottoms along Main and East Douglas Creeks have deep soils which support dense stands of greasewood.

Photo 1. Typical Winter Range on Cathedral Bluffs.

The author is a Range Conservationist for the Bureau of Land Management, White River Resource Area, Meeker, Colorado.

Greasewood is replaced by sagebrush on higher elevation bottoms. Production on the greasewood bottoms (and sagebrush bottoms) averages 400 lbs/acre and 800 lbs/acre, respectively. The mountain slopes are dominated by oakbrush/mountain shrub communities with pockets of Douglas fir found on the north-facing slopes. Production associated with mountain shrub community averages 3,600 lbs/acre. Production associated with the Douglas fir type is insignificant.

The summer grazing country (Photograph 2) is primarily a high elevation plateau with elevations ranging between 3,200 and 8,900 feet. Predominate vegetation types include mixed mountain shrub, aspen, and subalpine fir stands. The mixed mountain shrub type is found on most of the area with aspen, and subalpine fir found on the steeper slopes or in the drainages. Important species within the mixed shrub community include black sage, mountain big sage, snowberry, serviceberry, Columbia needlegrass, mountain and nodding brome, and onion grass. Production on this site averages 4,200 lbs/acre.

Range Conditions in 1976

Probably the best historical description available of the range conditions and livestock management on the Cathedral Bluffs Allotment was completed by Robert D. Nielson, private consultant, in 1976 at the request of the owner of the base property. The summation of Mr. Nielson's reports stated:

> This range and ranching operation is in an unstable watershed very vulnerable to accelerated soil erosion. Much of which has already taken place and some is now going on.
>
> It is apparent that the summer ranges have, during the past 40 years, been fairly well managed under a sheep operation. There is strong evidence of recent over use by cattle, particularly in the stream bottoms and along slopes. This is acute in the allotment. The winter ranges in the allotment are severely over used and some cattle were observed in these areas on September 13 (1976). There is very little feed remaining. Greasewood is dominant. Late spring and summer use has resulted in severe damage to the few forage species remaining and is contributing to accelerated soil erosion and invasion by halogeton, Russian thistle, cheatgrass, matchweed, and yellow brush (rabbitbrush).
>
> On the summer range of the allotment, there are numerous cattle of various breeding: hereford, charolais, angus mixed. Most were concentrated near water, although many were observed on the slopes due to scarcity of feed in the valleys. Vigor of principal forage species is low, some shrubs have been hedged severely. There was no evidence of seed stalks of palatable grasses (poa, brome). Serviceberry has been heavily used. Snowberry was severely hedged. Willows have been killed. Low growing chokecherry groves have been completely defoliated by grazing. Thistles are coming in and are also being grazed. On the slopes, palatable grasses have been almost eliminated and big sagebrush is increasing in percentage of composition and density.
>
> This overuse is considered by me to be "severe" in terms of BLM use classifications, on both the winter-spring-fall-winter ranges of the allotment. As a result of the continual abuse by cattle both as to numbers and season there is a decided trend of deterioration in range condition.

Mr. Nielson did not include in his description the over-grazing and declining range trend attributable to the wild horses. Wild horses are found throughout the winter and spring ranges. At the time of this analysis, the population of wild horses was estimated at 170 head. Many areas within the allotment were in poor condition solely as the result of wild horse use.

Management History Since 1976

The base private land of the Cathedral Bluffs Allotment was purchased by Tipperary Oil and Gas Corporation in 1976. Realizing the poor overall condition of the range, they requested and received approval for total nonuse for two years.

In 1978, the base properties and BLM grazing privileges were leased to William and Kathy Barnard. At this time, the BLM updated its land use plans and prepared a Grazing Environmental Impact Statement (EIS) for the Resource Area. The Cathedral Bluffs Allotment was reduced in grazing capacity from 5,731 active animal unit months (AUMs) to 4,295 AUMs. Over a five-year implementation period, conditions were improving, and a final stocking rate of 5,475 AUMs was established. The allotment was also designated as a wild horse herd management area with a population target of 30 horses.

An allotment management plan (AMP) was completed in 1986. The primary goal of the AMP is to improve range condition through implementation of a grazing system, adherence to utilization limits, and development of range improvement projects. During preparation of the AMP,

Photo 2. Typical summer range Cathedral Bluffs.

consideration was given for the care and maintenance of the wild horse herd.

The following is an overview of the grazing system. The low elevation winter range is used December 1 to April 1. There are few available waters on the winter range. As spring approaches and the snow leaves so do the cattle.

During the spring period the livestock drift and/or are herded through the spring/fall range. Calves are born, branded, and vaccinated during this period. The key to use during this period is to keep the cattle using snow and snow melt as an animal drinking water source, which allows use of the more productive north slopes. This type of use requires close monitoring of utilization levels, which are set at a maximum of 40% during the spring period.

The summer range has three pastures, one of which is deferred or rested each year. Summer use runs from July 1 to the end of September. Utilization levels are set at a maximum of 50% during the summer season.

Approximately October 1, livestock are gathered from the summer range and herded to the home ranch for processing. Fall gathering and processing occur during October and November. Fall utilization levels are set at 60%. With completion of processing, the herd is moved back to the winter range.

Initially, a rest rotation system for the winter/spring ranges developed. This proved unworkable because of snow depth. A deferred system which met the needs of range and livestock management was designed and implemented.

Improvements

Another problem on the allotment is a shortage of spring range. Water facilities were developed on the uplands to increase use in areas that lacked water. To increase the spring forage, 420 acres of pinyon/juniper were chained and then seeded in 1986. Species seeded included pubescent wheatgrass and dry land alfalfa. The area underwent a prescribed burn in 1989 (Photograph 3). Available forage production increased from 200 lbs/acre to 1,500 lbs/acre.

Photo 3. Willow Creek Chainings.

Three-hundred-fifty acres of greasewood bottom were mechanically treated in 1984 and followed up with herbicide treatment in 1986 and 1987. The principal forage species, western wheatgrass, increased in production from 350 lbs/acre to 1,000 lbs/acre. The mechanical treatment of greasewood did not kill much of the brush, but did make it more susceptible to herbicidal treatment.

Current Conditions and Trends

A number of range trend studies were established in 1979 and 1980. The studies showed that rangeland conditions have improved significantly since 1976. The winter range cover of the key forage species increased by 20% (basal cover) over an eight year period. Drainage bottoms which

Photo 4. Bear Park on the Cathedral Bluffs Allotment.

had virtually no perennial grass cover were colonized by western wheatgrass. In some study plots, cover of western wheatgrass changed from 0% to 84%. (Photograph 4).

The most significant improvements occurred within the spring/fall range in the riparian zone of East Douglas Creek. In 1978, East Douglas Creek was a deeply incised gully with active lateral sloughing, and sheer banks which averaged 12 feet deep. The woody component of the riparian vegetation was sparse, with no vegetation along the stream course. A few beaver were present in 1978. Their dams had been constructed of sagebrush, greasewood and tamarisk. These dams were unsubstantial and unable to withstand spring runoff or intense summer thunderstorms.

Since implementation of a livestock management plan, willows have reestablished throughout the stream course (Photograph 5). Beaver have incorporated the willow into their structures, making them more substantial. The dams have raised the water level, which is influencing the adjacent terraces. Sagebrush has drowned and willows have established.

During this process, the sheer banks have continued to erode and slough into the stream channel. Even daily sediments are trapped by the beaver ponds. The channel base is building and the vertical walls are changing into vegetated slopes.

Cottonwoods and box elders have reestablished and are proliferating. Beaver populations are monitored to prevent overpopulation, which could cause over-utilization of the woody resources and create instability.

It should be mentioned that there has been a series of good precipitation years which have aided management and improved range condition. In looking at similar range types under differing management, the condition of the allotment shows remarkable improvement. For example, one vegetation type within the allotment is called the "Douglas Creek Tundra," which consists of an overstory of black greasewood and sparse understory of cheatgrass and blue burr stickseed. It changed first in overstory to a sand dropseed dominant, then to its current western wheatgrass dominant. The previously degraded condition was caused by allowing cattle to overuse the bottoms, instead of forcing them to use the forage on the uplands. Aggressive livestock management was responsible for this improvement in condition. Similar improvement can be seen throughout most of the allotment (Photograph series 6a-7b).

Any grazing success story must answer, "how did the cattle do?" When Bill Barnard came into the allotment, he had a good bunch of cows that had been producing 500 to 550 pound calves. The first year on the Cathedral Bluffs Allotment the calves averaged 350 pounds. After ten years, the average calf weight has increased to 500 pounds. Another indicator would be pregnancy rates. The first year pregnancy testing showed a ten percent open-cow rate with another ten percent calving late. Currently the open-cow rate is four percent and late cows are running two to three percent.

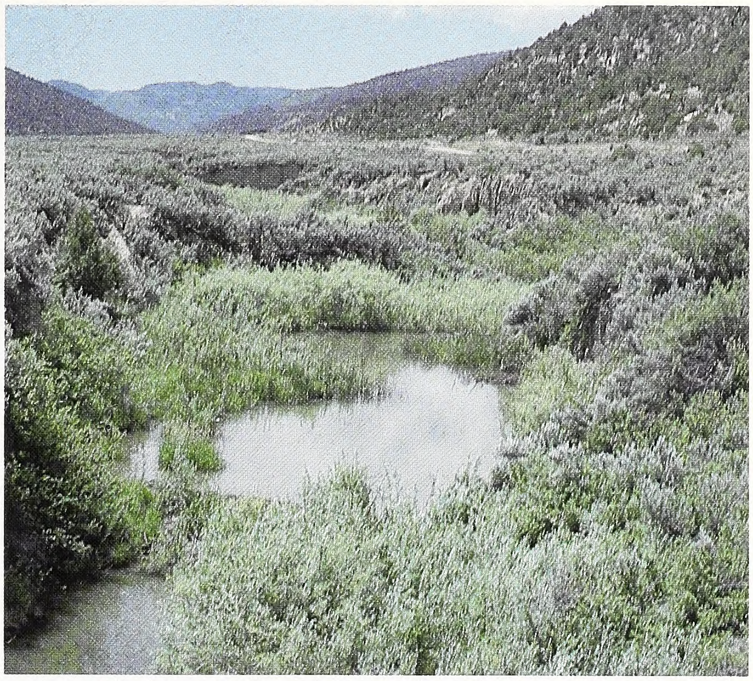


Photo 5. Riparian development on East Douglas Creek.

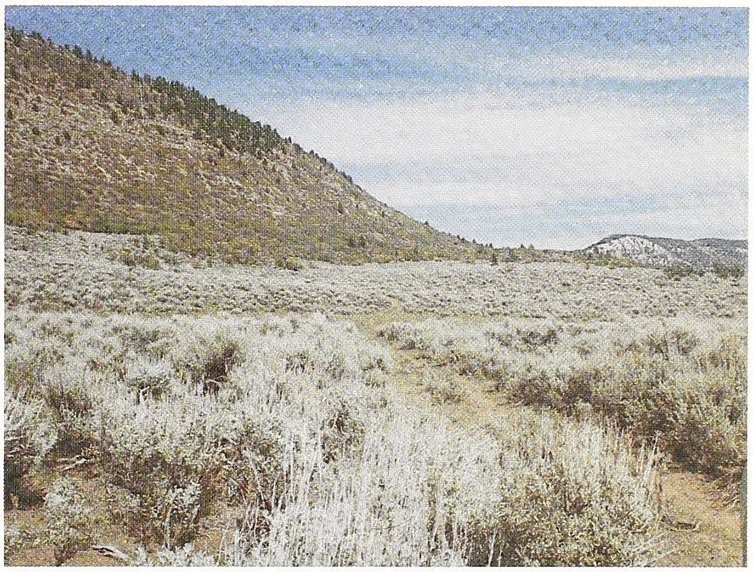


Photo 6a. Bench below Bear Park looking at Pike Ridge 1976.

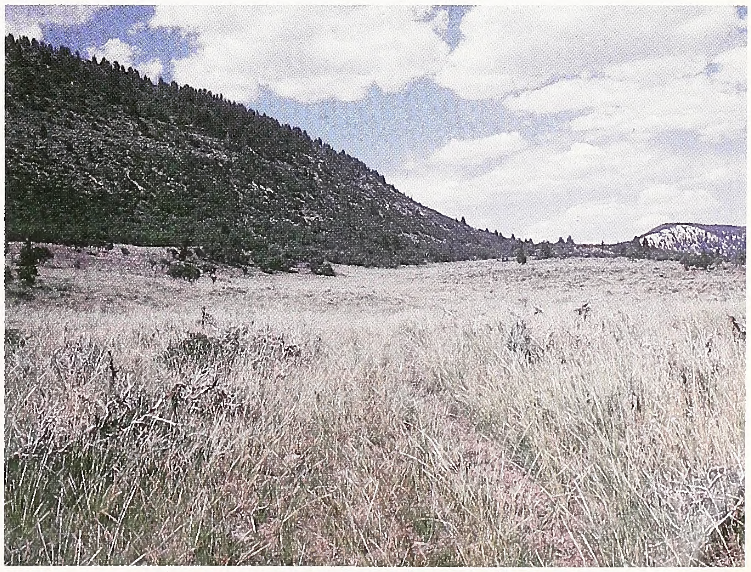


Photo 6b. Bench below Bear Park looking at Pike Ridge 1990.

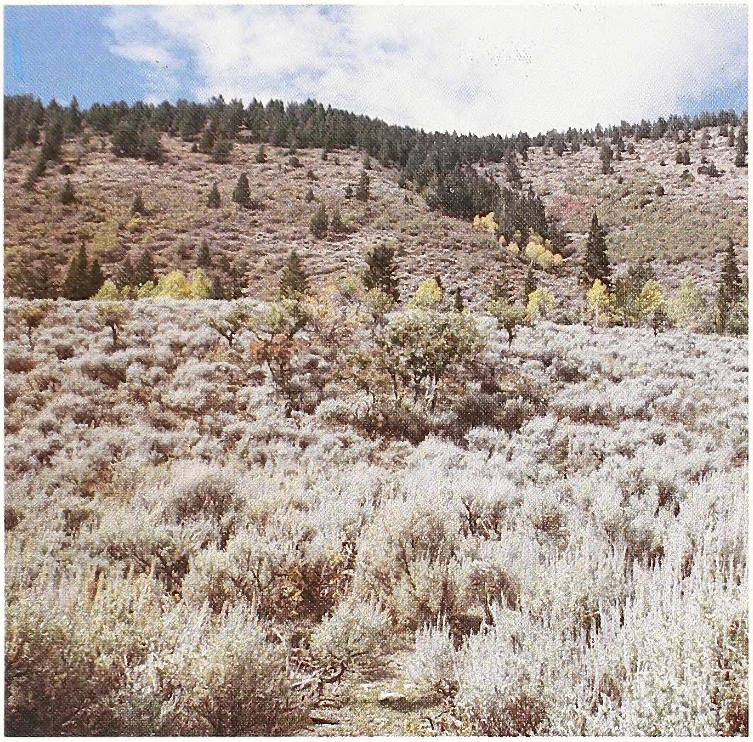


Photo 7a. Bear Park looking at Pike Ridge- 1976.

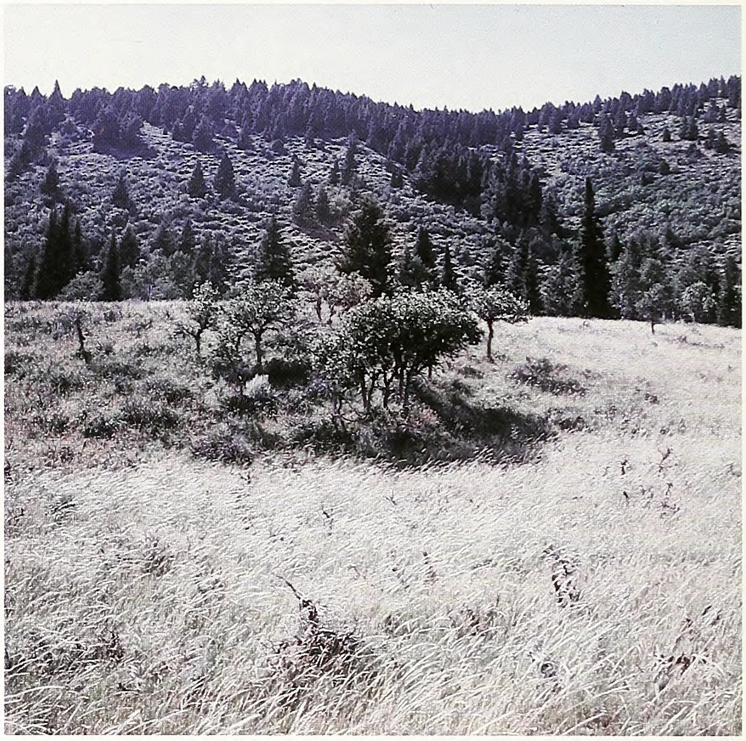


Photo 7b. Bear Park looking at Pike Ridge Sagebrush manipulation completed in 1983 (1990 Photograph).

Conclusion

The Cathedral Bluffs Allotment has shown excellent improvement since 1978. The cooperative relationship among the Bureau of Land Management and Ranch Manager, Mr. Sid Goodloe, and Ranchers William and Kathy Barnard, allowed a working Allotment Management Plan to be prepared and useful range improvement projects to be constructed. But all of this planning and range improvement work would not have changed the condition of the range if it were not for the dedication to the range and livestock shown by William and Kathy Barnard and crew. Their constant monitoring of use and moving of livestock has been critical to proper use of the rangelands on the Cathedral Bluffs Allotment.

GRAZING PRACTICES TO IMPROVE RIPARIAN AREAS

* Develop riparian pastures with separate management objectives and strategies.

* Integrate riparian pastures into overall grazing management programs so livestock can be rotated through pastures in a manner that protects plants, allows for adequate regrowth, and maintains soil stability.

* Alternate season of grazing.

* Graze riparian areas when banks are dry and there has been adequate time for regrowth.

* Shorten grazing periods in riparian pastures.

* Rest riparian pastures periodically, especially if the riparian area is in poor condition.

* Use riding, salting, drift fences, water development, sagebrush burning, and other practices to move livestock away from riparian areas and better utilize uplands.

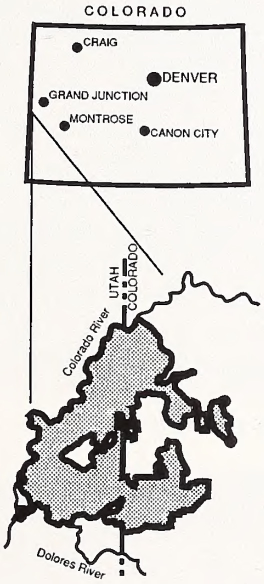
* Monitor forage utilization, trampling impacts, and condition of woody browse in riparian areas to assess current management practices.

* Exclude livestock from high risk riparian areas with poor recovery potential especially when there is no practical way to separate the riparian areas from uplands.

"Livestock" The Key to Resource Improvement on Public Lands

Al Tohill and Jim Dollerschell

Since the Taylor Grazing Act was set in motion in the mid-1930's, improving public rangelands has been perceived as a need to eliminate overgrazing by reducing livestock numbers. After 50 years of livestock reductions, along with the development of high dollar rangeland improvements and implementation of elaborate academic grazing systems, there continues to be undesirable plant encroachment (annual and perennial), lack of perennial grass seedlings, and absence of plant and animal complexity and diversity. This fuels a concerted effort by the environmental community to promote the complete removal of livestock from public lands.



The Mountain Island Ranch and Bureau of Land Management (BLM) offices in Grand Junction, Colorado, and Moab, Utah, have initiated a management process to improve the rangeland condition using techniques that are economically and environmentally sound. The management process involves both human interaction and collaboration coupled with non-traditional tools of grazing and animal impact. Livestock are recognized as a necessary component of the ecosystem rather than a deterrent to range improvement.

Setting and Background

The Mountain Island Ranch is situated between the Colorado River and the Dolores River southwest of Grand Junction, Colorado. The ranch straddles the Colorado-Utah state border and encompasses more than 163,000 acres. Within the ranch boundary is Bureau of Land Management Public Land administered by both Colorado and Utah (126,824 acres), Utah state land (8,491 acres), and ranch-owned property (27,851 acres). Large portions of both the Black Ridge Canyons and Westwater Canyon BLM Wilderness Study Areas are located within the ranch boundary.

Elevations range from 4,100 feet at the junction of the Dolores and Colorado Rivers to 8,833 feet on Pinon Mesa. Rocky canyon lands in the lower elevations receive about 8 inches of precipitation, progressing up to 16 inches in the higher terrain. Approximately 40 percent of the precipitation occurs during the growing season. There are 20 vegetation types present within these elevation differences. The lower and middle elevations are a combination of sagebrush, saltbush and/or blackbrush dominated grasslands. Oakbrush dominated mountain woodland types occupy the upper elevations. The pinyon/juniper type is prominent throughout the lower and middle elevations.

The owner purchased the ranch to capture a piece of the West and to enhance wildlife and natural ecosystem processes. These interests were influential in selection of management personnel and goals for the ranch.

Livestock grazing is the primary tool used to achieve the ranch goals which include improvement of the wildlife habitat. In the past five years the ranch has changed from a yearling cattle operation to a cow/calf operation, and recently included sheep. The following is a summary of the ranch operation since 1985:

1985–	1023 Yearlings
1986–	2005 Yearlings
1987–	3000 Yearlings, 244 Cows, 50 Bulls
1988–	1022 Cows, 50 Bulls
1989–	743 Cows, 49 Bulls, 1600 Sheep

Converting from a yearling operation to a cow/calf operation allowed for greater economic stability by avoiding the erratic market. Sheep were added to the operation to utilize areas not used by cattle. The sheep breeding program goal is to produce both red meat and high quality wool.

Upland Successes

This type of management has been practiced on the ranch since 1985, while the Allotment Management Plan (AMP) has been in effect since 1988. The land is healing itself, and at the same time is producing income from red meat in the form of livestock and wildlife.

The BLM uplands are characterized by low precipitation which is unreliable and erratic. Historic improper grazing in these brittle environments has increased the amount of bare ground and caused a problem of rapid soil crusting. Now, animals in the area at the proper time break or distrub the soil crust, allowing water to enter the soil. The animals also assist in incorporating organic matter into the soil surface either by trampling or in the form of

---

Authors are Range Conservationists, Bureau of Land Management, Grand Junction Resource Area, Grand Junction, Colorado.

urine and dung. The organic matter improves precipitation infiltration, allowing the water to percolate into the ground rather than be lost as surface runoff. Organic matter on the soil surface reduces evaporation and increases the duration that moisture is available to vegetation. The final production of animal impact is soil compaction, a necessary requirement for proper seedbed preparation of grass plants.

Perennial grass seedlings are proliferating, particularly in areas that have received heavy animal impact. Photograph 1a shows the area of a salt block placed the spring of 1987, which resulted in heavy animal impact. Photograph 1b is a plot that was established the following spring where the salt block had been placed, now covered with the perennial grass seedlings. Photograph 1c was taken during the spring of 1989, a drought year, from approximately the same photo point. Although 1989 was a drought year in western Colorado, a number of the seedlings (sand dropseed) in this plot reached sexual maturity and produced fruiting bodies. Animal impact and time-controlled grazing created the necessary conditions for seedling establishment in this area. The health and vigor of existing plants remain good (Photograph 2b).

Photograph 2a shows yearling steers present in June of 1987 at a fenced water point that serves three pastures. The animals impacted existing vegetation through utilization and trampling. Photograph 2b shows recovery of the same area in September of 1987 (note: spring 2a was taken with a standard lens and fall picture 2b with a wide angle lens). When grazing and animal impact are employed as tools, the element of time must be considered. Overgrazing is a function of time, note livestock numbers.

The roots of grass plants are the store house of their reserves. A grazed plant draws reserves from the roots to put on new growth. Once new growth is fully functional, producing carbohydrates through photosynthesis, the plant slowly restores root

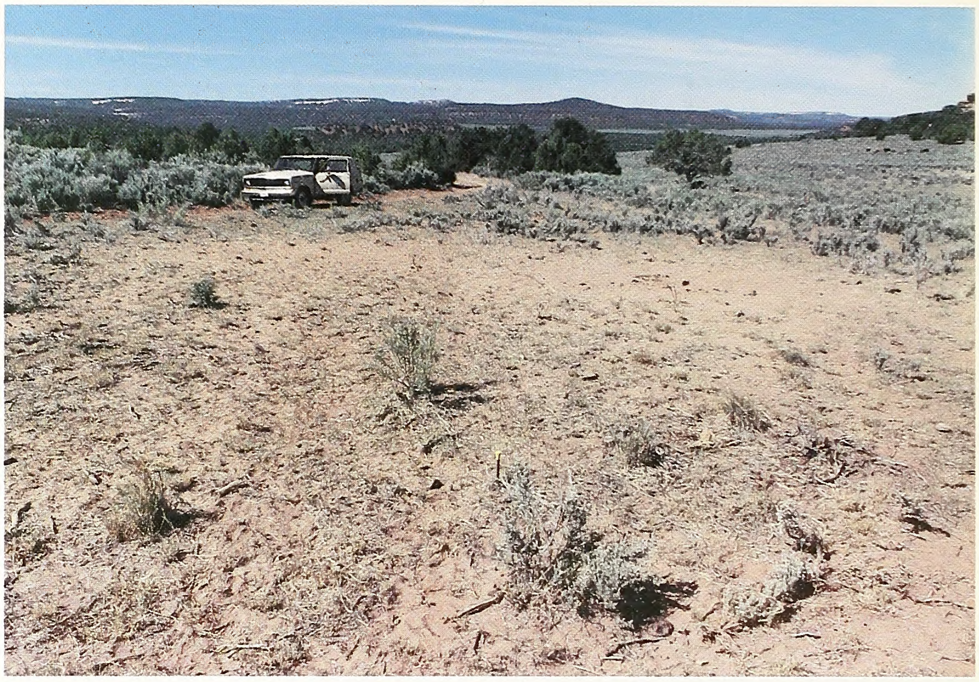


Photo 1a. Area of intentional salt block placement—1987.

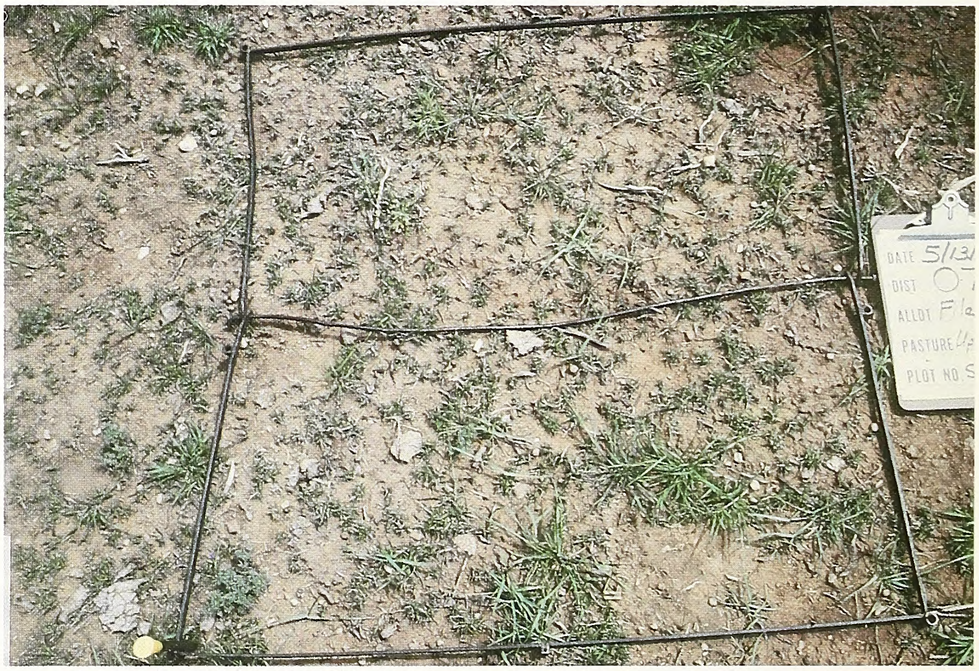


Photo 1b. Plot showing establishment of perennial grass seedlings—1988.

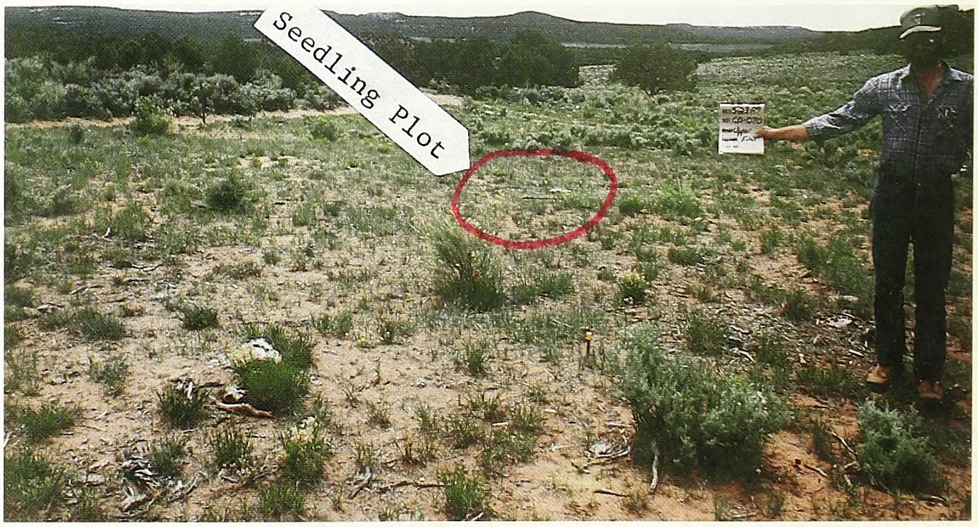


Photo 1c. 1989 aspect photo of area shown in September 1988.

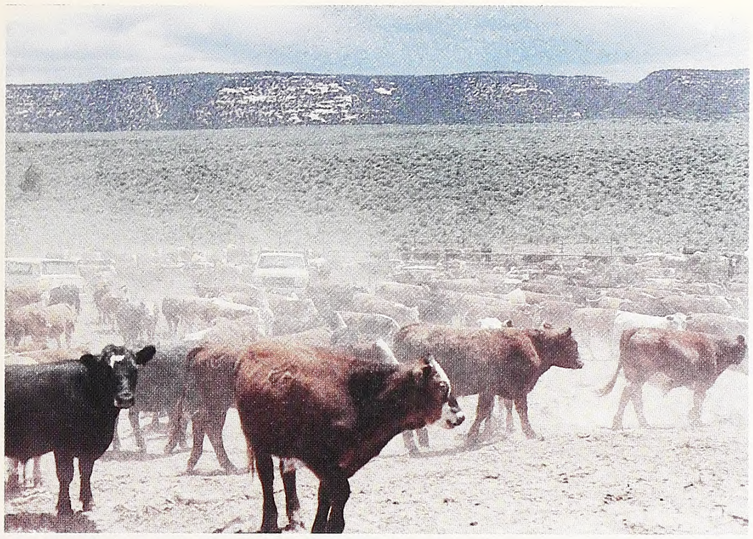


Photo 2a. *Yearling steers at water point—1987.*

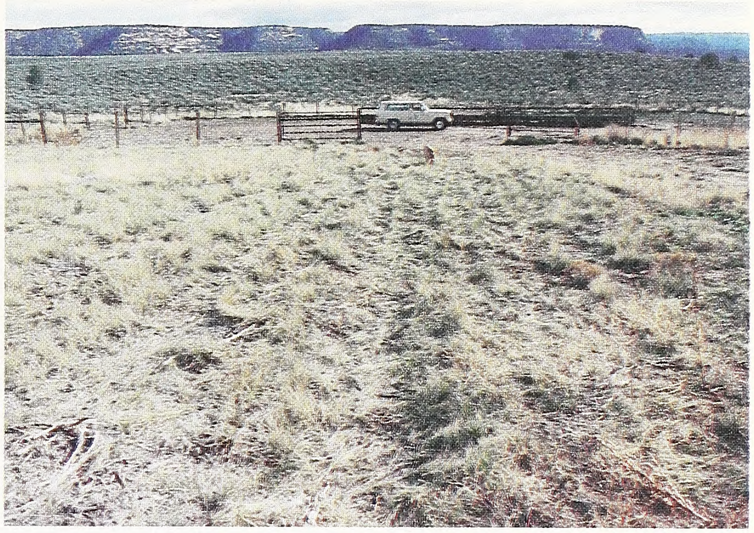


Photo 2b. *Recovery of water point—1989.*

reserves to pre-grazing levels. Animals seek out succulent regrowth over ungrazed plants which are comparably coarser and less palatable.

Overgrazing occurs when regrowth is grazed before root reserves have been replenished, further depleting the root system. This commonly occurs when livestock are present too long during periods of rapid plant growth (when moisture and temperature conditions are optimum). If present long enough, one animal or a thousand animals will seek out succulent regrowth over ungrazed plants.

Whenever there has been a perceived overgrazing problem on public lands the standard prescription has been to reduce livestock numbers. Grazing duration, the major cause of overgrazing, is unaffected by livestock reductions. Remaining livestock continue to seek out regrowth (overgrazing individual plants) while the number of ungrazed plants increases (overrest).

The ranch has minimized overgrazing and overrest through high animal stock densities for short periods of time. Grazing periods range from several days to several weeks, depending on the plant growth rate. Livestock are then removed for a period of time sufficient for complete plant recovery. This process may then be repeated following full plant recovery. A constant vigil of monitoring both plant growth and animal performance is required. Commitment to monitoring by the livestock operator is paramount.

Riparian Successes

As the uplands are considered brittle environments, riparian areas are considered non-brittle environments. This is due to the presence and influence of water. Unlike a brittle environment, the water cycle and mineral cycle will function properly under non-grazing conditions (rest). Plant material that remains intact through rest will rapidly return to the soil allowing the mineral cycle to function properly. Individual plants remain healthy and unobstructed which ultimately leads to tighter ground cover and species complexity.

Rest applied in non-brittle environments can be a useful tool for obtaining healthy riparian areas. The problem is demonstrating that livestock and a healthy riparian area can exist together. The Mountain Island Ranch is using livestock as a tool to improve riparian areas. Proper upland management is essential for obtaining a healthy riparian area, the two go hand in hand. Improving water and mineral cycles in the uplands has allowed precipitation to enter the soil, from there it travels underground and is slowly released into the riparian areas. This helps restore the natural watershed function through underground flow, rather than surface runoff.

Photograph 3a is a picture of the riparian area along the Little Dolores River in the Upper Files paddock. A quarter-mile of this stream, situated in the corner of this 2,000 acre paddock, is the sole water source. Grazing use in this paddock for 1988 was 667 cow/calf pairs for 14 days in June. This picture, taken shortly after livestock were removed, depicts the animal impact and associated heavy utilization that occurred. A cowboy stays with the livestock preventing them from lounging along the stream.

Photograph 3b, taken in early September of the same year, shows the tremendous regrowth of willows. These willow populations are stable and show no signs of decline.

The AMP provides a management guideline to assure two processes are being accomplished:

1. bank protection during high energy flood events; and
2. trapping of sediment for the bank building process.

Regrowth in riparian areas serve both purposes. The guideline separates growing season grazing and dormant season grazing as it relates to riparian areas.

The guideline for the growing season grazing period specifies that time be allowed for sufficient vegetative regrowth to provide adequate plant cover for bank protection and sediment trapping. Photograph 4a was taken along the same quarter mile section of the Little Dolores River immediately following removal of livestock in June of 1989. Growing season grazing use had been 387 cow/

calf pairs for 19 days. Note the animal impact and heavy utilization. Photograph 4b is the same site taken in September of 1989 after regrowth had occurred. Overhanging banks have remained intact through maintenance of healthy root systems ensured by time-controlled grazing.

The beaver dam was built following cattle removal in June. This activity will aid in expanding the riparian zone by raising the water table and increasing water storage in the area.

In the riparian areas, regrowth will not occur prior to spring runoff if grazing occurs during the dormant season. Therefore, the guidelines call for utilization levels of herbaceous vegetation such that a minimum stubble height of 5 inches remains. This remaining stubble encourages adequate vegetative cover for bank protection and sediment trapping.

Photograph 5a shows Coates Creek in the Humphrey Springs paddock which was grazed for 12 days by 48 bulls in April of 1989. The photograph, taken shortly after livestock were removed and prior to spring runoff, shows the stubble that will be present when runoff occurs.

Photograph 5b shows the same location in September of 1989 and the regrowth that occurred. Bank building is evident by the sediment trapping of the vegetation and narrowing of the stream channel.

The tool of animal impact provides a means of breaking down existing cut banks that are devoid of vegetation and susceptible to further erosion. Steep-walled cutbanks are trampled to an angle of repose which allows establishment of vegetation which in turn begins the bank building process. Another result of animal impact has been the removal of old, tall sagebrush which invaded and how dominates areas adjacent to some streams. Removal of sagebrush and application of time controlled grazing has allowed succession to move forward, increasing species diversity and complexity, resulting in greater productivity for wildlife and livestock.

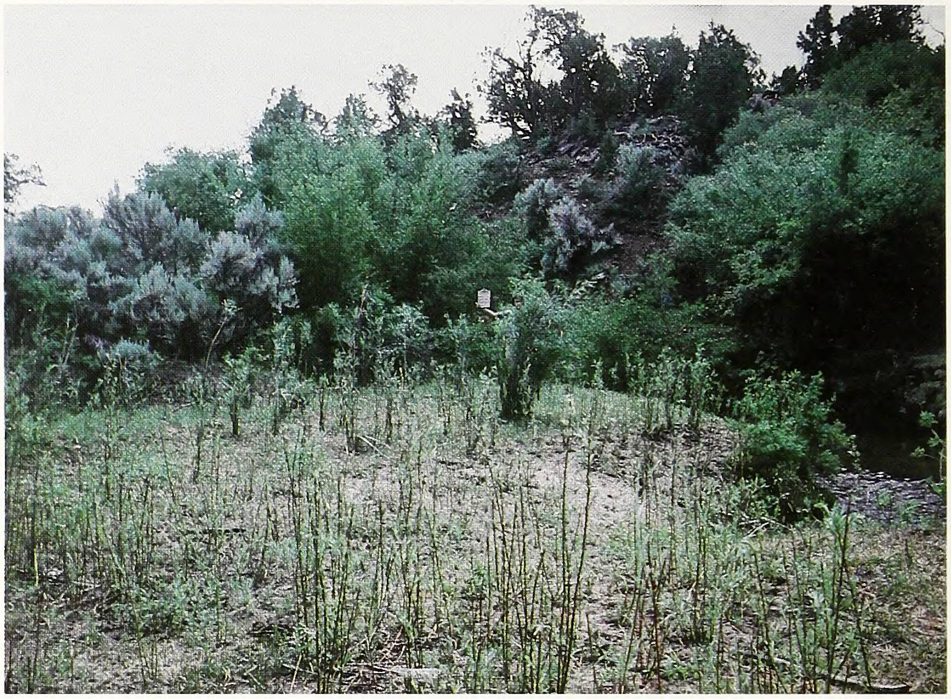


Photo 3a. Riparian area on Little Dolores River after intensive grazing—June 1987.

Wildlife

Big game populations appear to be thriving as evidenced by the ranch's guide and outfitting business. The last three years the ranch has averaged a harvest success of 100% for deer and 90% for trophy bull elk. This has contributed an average of 19% to the total gross ranch income during this period. All types of wildlife receive priority in relation to livestock grazing. Livestock moves are planned to avoid conflicts with wildlife use. Examples are livestock avoidance in certain areas during periods crucial to bird courting and nesting, elk calving and deer fawning.

Livestock Production

The first three years the ranch ran

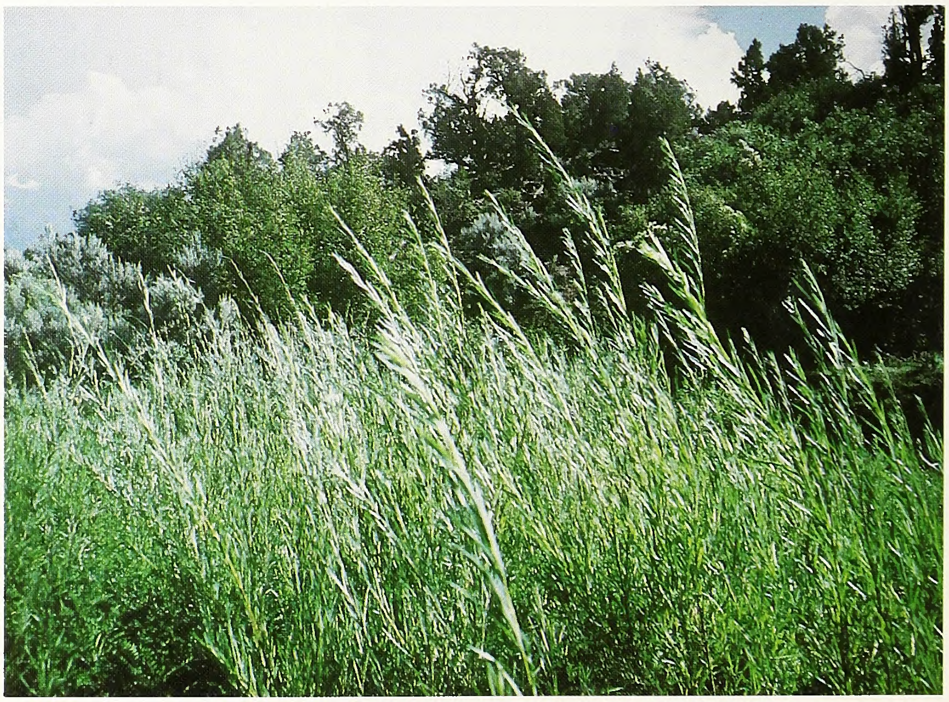


Photo 3b. Little Dolores River riparian area—September 1988.

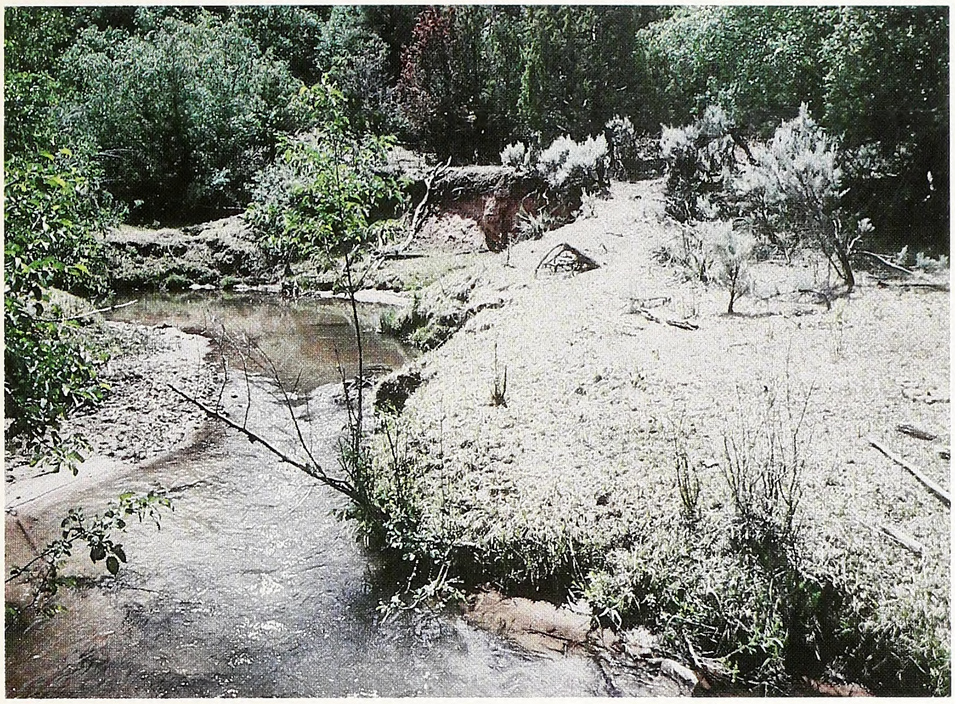


Photo 4a. Little Dolores River following intensive grazing—June 1989.

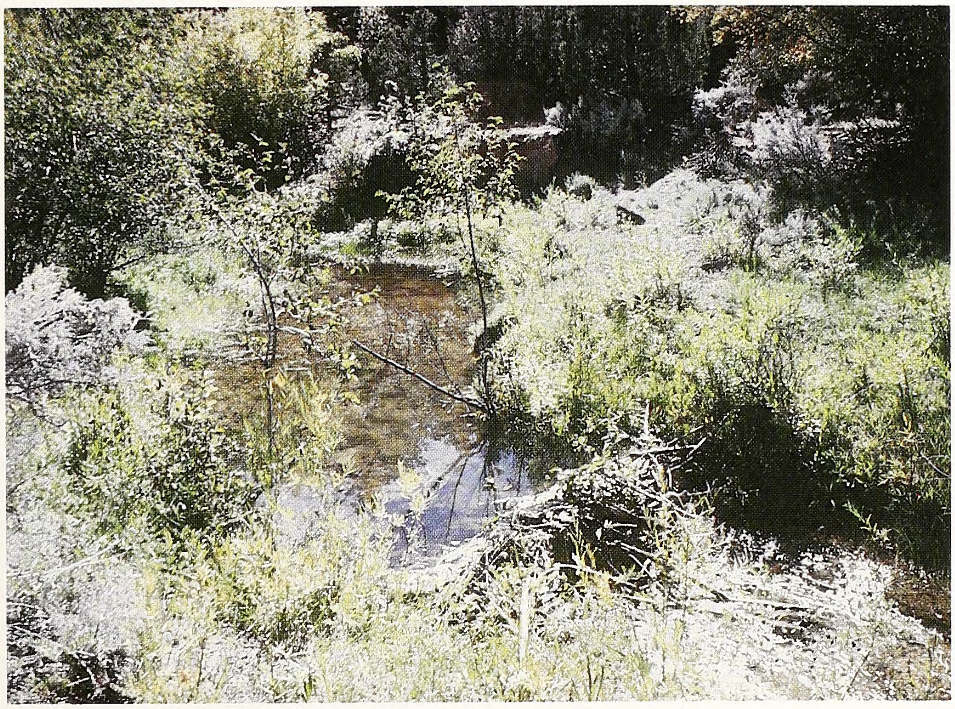


Photo 4b. Same area in September 1989.

yearlings and averaged 1.55 pounds per day rate of gain. In 1988, the first year under a cow/calf operation, weaning weights averaged 502 pounds. Livestock production has benefitted from the daily involvement of ranch personnel. Diseases are detected early, allowing effective treatment and rapid recovery of diseased or injured animals, lowering the percentage of death by 10%. In 1989 there was a total death loss of 3 cows and a calf crop mortality of 5%. The practice of herding livestock has improved the percentage of cows being bred back. In 1989, they had a breedback success of 91%.

Time-control grazing requires frequent movement of livestock and initially can be stressful to the animals. Mountain Island Ranch is presently training the cattle to come to a call (whistle).

Development of the HRM Grazing Plan

The accomplishments achieved to date have been the result of implementing Holistic Resource Management (HRM), a process developed by Allan Savory. HRM was chosen as the preferred management for the Mountain Island Ranch based on the owners' concern for wildlife and natural ecosystem processes.

In 1985 the Grand Junction and Moab BLM offices granted the Mountain Island Ranch a one-year trial period to run livestock on BLM Public Land using HRM principles. At the end of the trial period, the allotments were evaluated to determine potential for long-term commitment to the development of a HRM allotment management plan. The plan combined these allotments into one unit to be managed as a whole. The evaluation was favorable and the development of a long-term plan began in late 1986 by then Grand Junction District range conservationist Gene Kinch.

The development of the HRM plan was accomplished through meetings with ranch personnel and BLM staff members from both the Grand Junction and Moab offices. The BLM specialists involved were wildlife biologists, range conservationists, planners, and recreation and wilderness specialists—resource interests which have historically had different opinions about resource management.

Through development of trust and collaboration the meetings produced the following three-part goal:

Quality of Life

Manage the land to maintain a rural character, free of pollution, with a peaceful family setting. Minimize the use of chemicals.

Production

Realize a profit from the production of wildlife, crops, and livestock.

Landscape

Allow fire to assume its natural role in plant succession.

In Wilderness Study Areas—Manage the land within the wilderness study

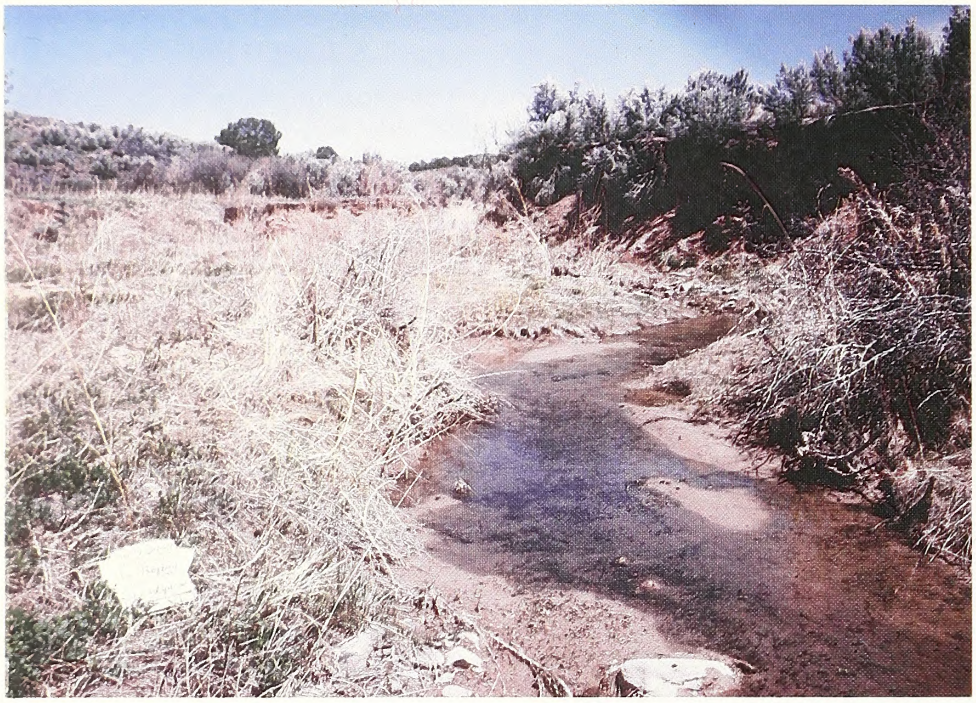


Photo 5a. Coates Creek intensively grazed—June 1989.

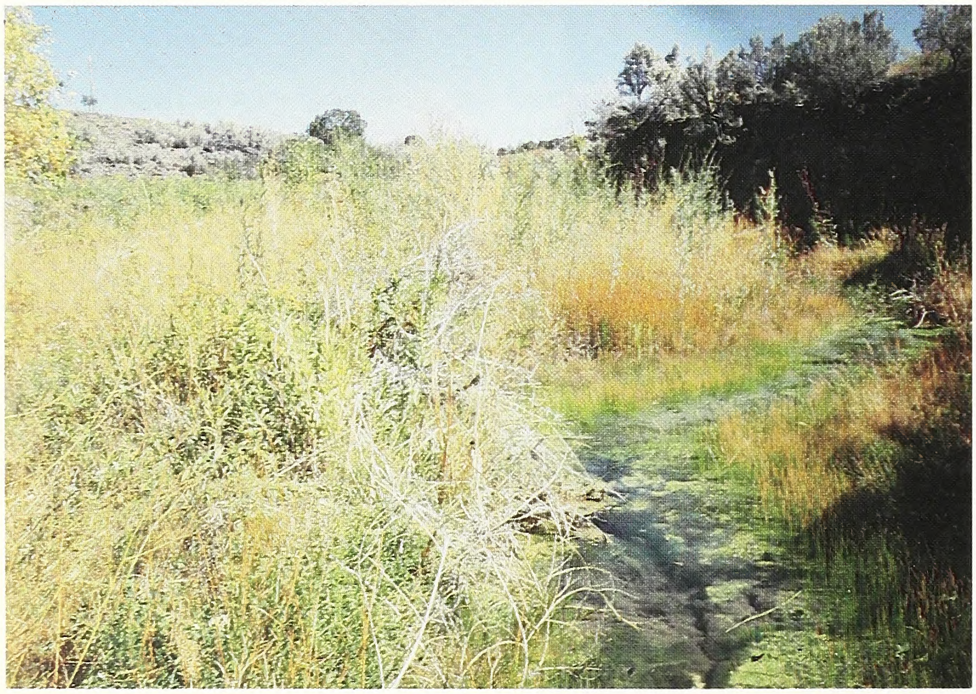


Photo 5b. Coates Creek recovery—September 1989.

area to:

1) allow for development of the variety of landscapes present,
2) emphasize wilderness values,
3) avoid damage to cryptogamic soils as a result of livestock grazing in portions of the area, and
4) minimize visual impacts from livestock.

Outside the Wilderness Study Areas maintain an uninhabited natural appearance, unroaded with few structures or improvements and with minimum disturbance by humans. Protect cultural resources and aesthetic values.

Develop good water and mineral cycles as well as energy flow on the range.

1) Retain and build soil in place and insure the land is as productive as feasible.
2) Restore natural watershed function and improve water quality.

Optimize production of a diverse, stable wildlife population including but not limited to big game, fish, and threatened and endangered species.

Goals for riparian areas were further delineated in the landscape description. A number of riparian areas in the allotment were recognized as being in degraded stages evidenced by steep, barren stream banks, wide and shallow stream profiles, minimal stream shading, and lack of overhanging banks. The emphasis of the goals was to allow riparian areas to perform their natural functions of bank building through sediment trapping, water storage and timely release, and aquifer recharge.

The next step in working toward the three-part goal was selecting the proper tools to manipulate the four ecosystem blocks. The four ecosystem blocks are water cycle, mineral cycle, energy flow and succession. All the tools known to mankind are rest, fire, grazing, animal impact, living organisms and technology (HRM Model Figure 1).

Tools selected in the uplands were: *grazing, animal impact, rest, fire, organisms* and *technology. Grazing* and *animal impact* were automatically chosen because a large part of the ranch falls within a brittle environment. *Rest* was chosen in partial form because plans are to graze each pasture only once during the course of each year. *Fire* would assume its natural role where feasible. There are sites with dense stands of sagebrush 8 to 10 feet tall where animal impact can not be used successfully to induce succession toward the three-part goal. *Fire* was selected to open up these areas so *animal impact* could be applied.

Living organisms would be utilized in an indirect manner to promote soil fertility (earthworms, microorganisms, etc.) and aid in the mineral cycle (dung beetles, ants, etc.). *Technology* would be applied in the form of control (fencing) and water developments (spring developments, wells, pipelines and troughs, etc.).

Tools selected to achieve the riparian goals were: *rest, technology, grazing,* and *animal impact. Rest* was used to move succession toward the

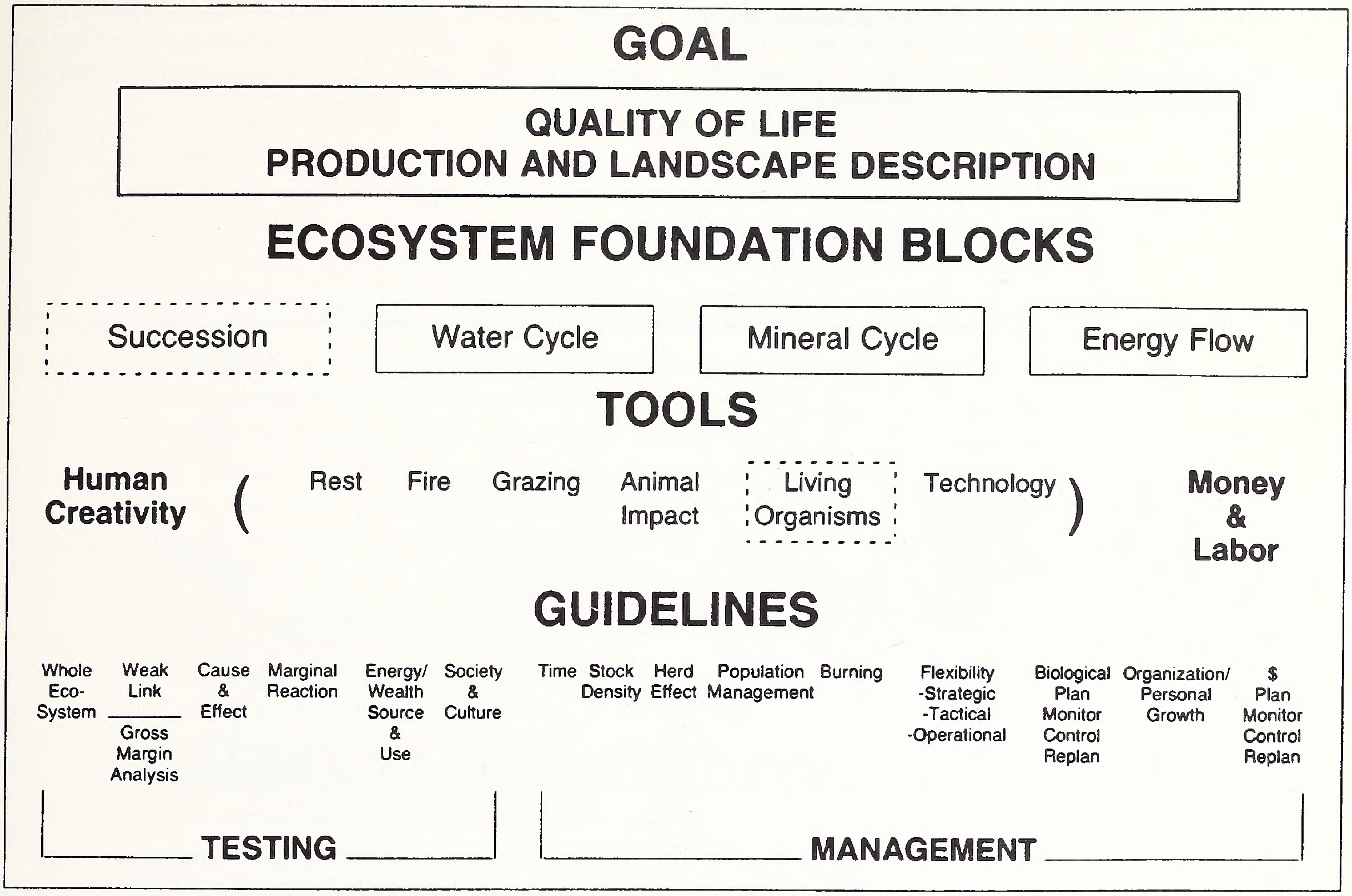


Figure 1. Holistic Resource Management Model. Copyright 1980 Center for Holistic Resource Management.

goals. It was also deemed necessary in some areas to achieve diversity in canopy heights. This would involve rest for a year or two to allow woody vegetation to attain a height exceeding the reach of livestock. *Technology* was selected in the form of control (fencing) to eliminate small areas of excessive animal impact. *Grazing* and *animal impact* were selected for the same reasons they were chosen for the uplands, to improve water and mineral cycles. As in the uplands, time control of grazing is the key. Livestock grazing occurs in the riparian area for a short period (several days to several weeks.) Livestock are then removed, allowing for complete woody and herbaceous vegetative recovery before grazing again.

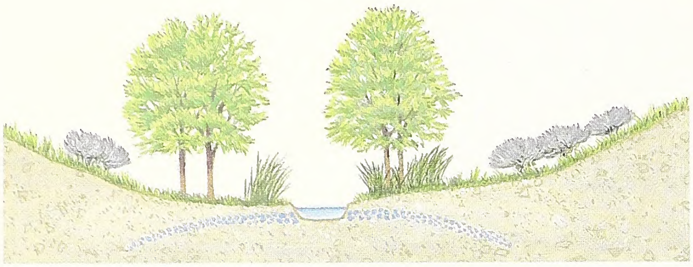
A vast majority of the ranch-owned property and associated BLM and Utah state lands were previously divided into use areas. These use areas were further defined into 54 paddocks or pastures. A biological plan was constructed for the ranch. Each paddock was charted, showing any livestock conflict and when during the year it occurred. Once all paddocks and their conflicts were charted, livestock moves were planned to avoid conflicts. The biological plan focused attention on these situations and stimulated an appropriate monitoring level to help minimize the conflict.

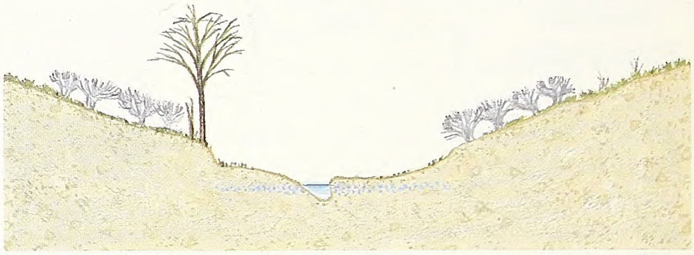
The biological plan is prepared twice a year, one for growing season grazing and one for dormant season grazing. Both plans, especially the growing season plan, are altered as necessary from monitoring information. This part of the process is what is known as PLAN-MONITOR-CONTROL-REPLAN and serves as the heartbeat of the entire plan. HRM is not a "grazing system" but a highly dynamic process that changes with the "ebb and flow" of nature.

Once the Mountain Island HRM allotment management plan, associated biological plan, and environmental assessment report were completed, a comprehensive review process was initiated. The review process included wilderness and environmental interests groups, Colorado and Utah state wildlife agencies, and BLM specialists from both Grand Junction and Moab offices. Tours were conducted for any group that had questions and/or concerns. The review went extremely well due in large part to the collaboration established at the onset of the process.

Conclusion

HRM is not a quick fix solution. Successes enjoyed to date have been the result of cooperation, time, and support of the Mountain Island Ranch and BLM management in Colorado and Utah. This type of management requires commitment, intensity, and risk taking. With risk taking come mistakes, but through the PLAN-MONITOR-CONTROL-REPLAN process, problems have been detected early and resolved before becoming catastrophic. Human creativity used to resolve these problems has served as the foundation for this continuous learning and building process called Holistic Resource Management.





PROPERLY MANAGED RIPARIAN AREAS:

Reduce Flood Damage and Decrease Soil Erosion: Trees, shrubs, and grasses dissipate energy by slowing the speed of flood waters. This results in lowered flood heights and reduces the water's erosive potential.

Protect Water Quality: Riparian vegetation functions as a "living filter" to trap sediment, nutrients, and chemical and organic waste that are carried from the surrounding land during and following storms.

Maintain Stream Flows: Stable riparian systems and wetlands function like sponges to hold water. This increased streambank storage capacity helps maintain year-round stream flow.

Maintain Water Temperature; The riparian zone maintains stream water temperature by providing shade. Shade is particularly important for preventing loss of water through evaporation.

Provide Recreational and Aesthetic Qualities; Riparian areas are focal points for recreational use such as fishing, hunting, camping, and hiking.

Improve Fish and Wildlife Habitat; Riparian areas provide food, cover, water, migration routes, shade, etc.

Improve Livestock Forage; Healthy riparian areas can periodically provide better quality and quantity of forage for livestock.

RANGELAND MANAGEMENT

The art and science of Range Management began nearly 100 years ago when the first problems of improper grazing were recognized. Range managers were generalists, often responsible for providing expertise on all subjects pertaining to natural resource management. Most concepts of the early days were viewed from the perspective of the livestock industry. For example, range condition reports were primarily based on how well the range provided forage for cattle and sheep and often contained criteria for assessing soil erosion. Little reward was given to the condition of the land for wildlife, recreation, and other values considered important today. Range condition reports still reflect the forage conditions of past and recent history.

Range Management has changed, just as society has changed, from Range Management into Rangeland Management. Rangeland Managers administer a multitude of resources, from wild horses and wildlife habitat issues, to recreation and mined land reclamation. Issues have become more complex, requiring new thinking and application. Rangeland livestock grazing is now considered a means to accomplish resource recovery and improvement, as well as an energy efficient source of food and fiber. Properly managed livestock are effective tools for improving vegetation, much like mowing a yard or pruning a fruit tree properly can stimulate the plants for more vigorous growth. Managing rangelands subject to extremes in climate, soils, and vegetation requires patience, for change is slow, even in the best of conditions.

In Colorado, 25 Range Conservationists administer approximately 8 million acres of Public Lands (approximately 500 square miles per person), not including private and State of Colorado lands. Management involves 2,500 management units (allotments) throughout the state. Three-hundred-fifty allotments are currently under intensive management and 450 allotments are in need of allotment-specific planning. About 1,700 allotments do not require intensive management.

Colorado begins a new decade and makes a leap into the 21st century by committing its limited personnel to the basic tenets of natural resource management and to understanding and developing new technology and concepts. Multiple use and sustained yield will receive continued support. Riparian Area Management, Biological Diversity, Holistic Resource Management, and the Desired Plant Community concepts and processes will receive additional attention. Cooperative partnerships with interested groups will be continued and expanded. A concerted effort will be made to inventory the Public Lands using ecological concepts, which will provide the information to make sound resource management decisions. High priorities will be to match resource uses to the capabilities of the land, and to manage for vegetation communities which will provide the resource values for the next century.

FRONT/BACK COVER

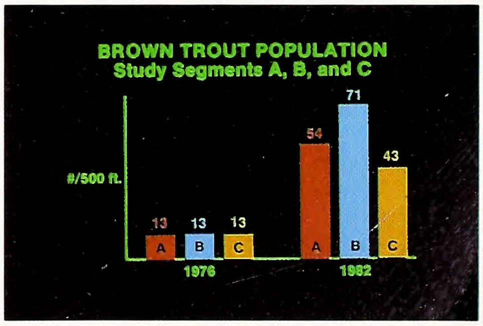
The cover depicts the Texas Creek Riparian Enhancement Study which was established in 1976 by Don Prichard, BLM fisheries biologist. The study area is located in south central Colorado in BLM's Canon City District. Texas Creek, a tributary of the Arkansas River, originates in the Sangre De Cristo Mountains.

The study objective was to demonstrate selected management strategies to enhance aquatic and riparian resources. The study area was divided into three segments:

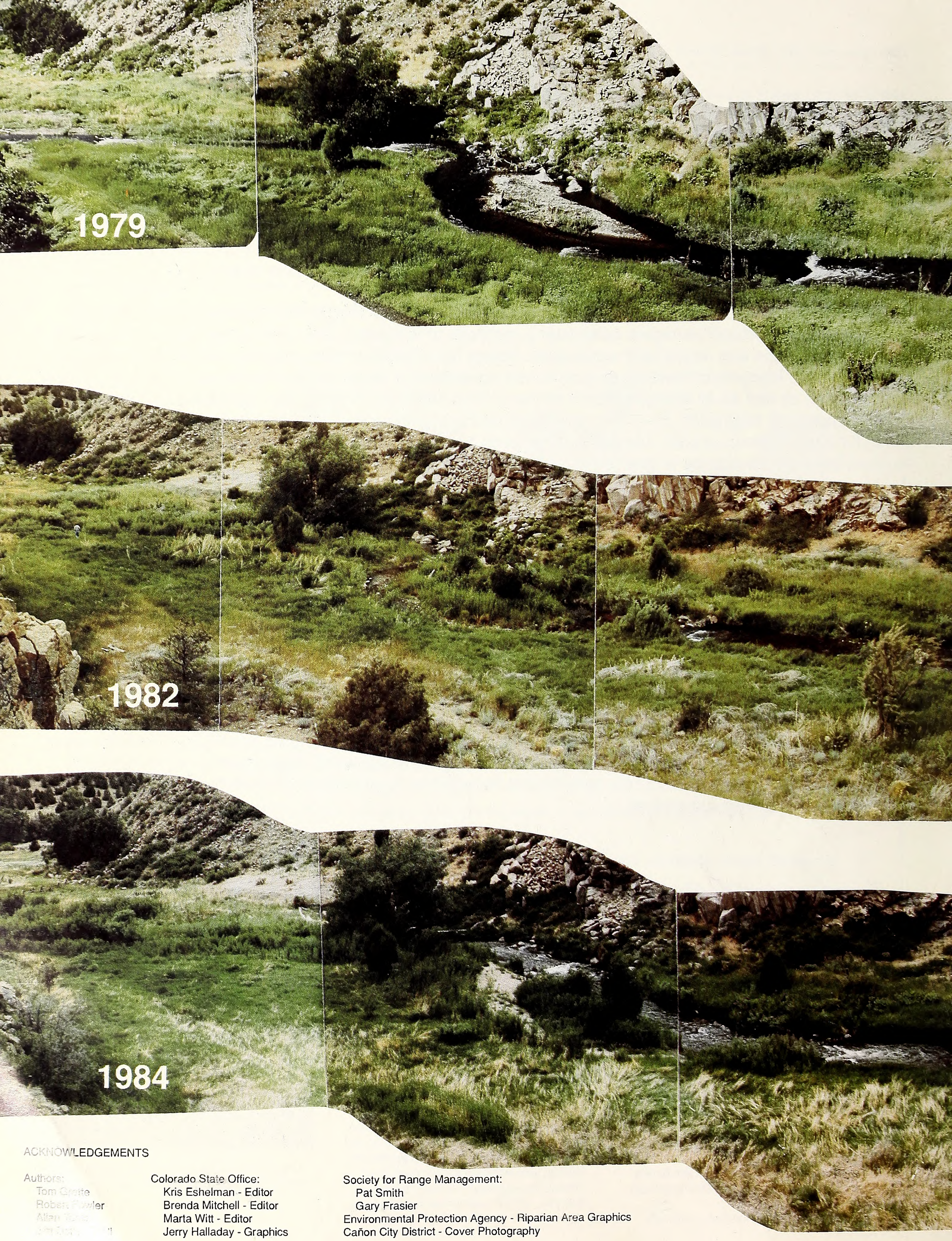
- **A- Deferred seasonal grazing with no habitat treatments**
- **B - Livestock exclusion with intensive fish habitat treatments (instream structures, willow plantings, bank stabilization)**
- **C - Livestock Exclusion, no habitat treatments**

After implementing the three management treatments, all study segments showed dramatic improvement. Texas Creek progressed from a stream unable to sustain a wild trout population, due to deteriorated habitat conditions, to a highly valuable brown trout fishery.

There are alternatives to improving poor riparian conditions. Not all alternatives will produce optimum habitat but many will provide good habitat. The study shows that enhancement of riparian habitat can occur with deferred livestock grazing, protective fencing, and extensive habitat treatment. Without management, we lose important fisheries, wildlife, and economic resources.



Comparison of Texas Creek fish populations before and after implementing management.



ACKNOWLEDGEMENTS

Authors:
Tom Grette
Robert Fowler
Allan [illegible]
[illegible]

Colorado State Office:
Kris Eshelman - Editor
Brenda Mitchell - Editor
Marta Witt - Editor
Jerry Halladay - Graphics

Society for Range Management:
Pat Smith
Gary Frasier
Environmental Protection Agency - Riparian Area Graphics
Cañon City District - Cover Photography